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Abstract

In this paper we employ survey information on more than 10,000 Southern and Eastern European firms and panel data methods to assess the effects of the COVID-19-related lockdown and government support policies on the business operations of enterprises. Our findings reveal considerable size- and sector-related effect heterogeneity, with small firms, exporting firms and firms operating in the facility sector experiencing the largest losses in terms of sales. A complete lockdown leads to an average decrease in sales by approximately 64%. We also document a disproportionate impact on female self-employed. Furthermore, state aid in the form of deferral of payments or wage subsidies were the most effective government support instruments. For instance, wage subsidies saved up to 2.7 employees per firm in the surveyed enterprises.

JEL-Codes: D220, H120, H320.

Keywords: Covid-19, firms, government support policies, panel data methods.

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1 Introduction

The year 2020 will be portrayed in history books as the year the COVID-19 pandemic disrupted economies worldwide and individuals suddenly faced a drastic change of their lives. The negative effects of this shock are looming large across countries and sectors of the economy. Governments have undertaken tremendous efforts to contain the spread of the virus, even if that meant lockdown of economic sectors for varying time periods and thus drastic implications for businesses and the employed. At the same time, vast state support funding has been deployed to sustain businesses in coping with the negative economic consequences triggered by the pandemic.

In this paper we contribute to the nascent literature that addresses the effects of COVID-19 related lockdown as well as government support policies on firms. Quantifying the magnitude and heterogeneity of the containment measures along different dimensions is paramount to gain an accurate picture of the most hardly hit firms and sectors. This in turn assists policymakers in designing the appropriate response policies and targeting those most in need.

The present crisis has revealed how vulnerable societies are to diseases that start in a particular area of the world and then spread like wildfire over the globe, and highlighted the risk of similar situations arising in the future. Thus, we also provide insights that can be translated to future epidemics that require stringent government intervention and subsequent support policies to cushion the negative impacts on people's lives.

We employ information from the World Bank Enterprise Survey (WBES) and the first wave of the World Bank Enterprise Follow-up Survey on COVID-19. While in the regular WBES, business owners and top managers of firms of different sizes, active in different economic sectors, are asked about the characteristics, climate, and constraints of their business operations in the respective countries, the follow-up questionnaire aims at collecting timely information on sales, liquidity, operations of the business, labor adjustments or expectations about the future during the COVID-19 crisis. The data sample includes around 10,000 firms of a rather homogeneous group of 23 Southern and Eastern European countries where we

have information on both, the business operations of the respondents before and during the pandemic.

On average, we document that firm size, exporting status, female ownership, innovative capabilities, as well as sectoral affiliation determine firm performance, as governments increase their response stringency. As opposed to other types of shocks where one could argue that exporting firms are in a better position to cushion the negative impact, the current pandemic triggered a more pronounced decline in sales of those enterprises that depend on exports. Furthermore, we also provide evidence of significant size- and sector-related effect heterogeneity. The magnitude of the effect on year-on-year sales change is 0.14 percentage points higher for small compared to large enterprises and the discrepancy is more pronounced for higher values of the response stringency indicator. A similar picture emerges for firms in the facility sector relative to other economic sector. Firms in the former experience larger losses in terms of sales and the gap relative to firms operating in other sectors intensifies with increasing lockdown strictness. Since the share of female owners is also higher in this sector, the pandemic disproportionately affected female self-employed compared to their male counterparts.

We also scrutinize the effectiveness of different government support policies such as deferral of payments, fiscal incentives or wage subsidies to alleviate the negative repercussions of the lockdown. Firms that received wage subsidies recorded 33.8% fewer redundancies compared to firms receiving other types of support. Assuming a firm in the dataset laid off on average between 3.3 and 7.8 employees[1], implies that wage subsidies saved between 1.1 and 2.7 employees per surveyed firm.

The remainder of this paper is structured as follows: Section 2 reviews the related literature, Section 3 provides an overview of the data and Section 4 addresses the correlation between government response stringency and firm performance. The impact of government support policies on financial and labor market and financial outcomes is analysed in Section

[1]The first number refers to the unrestricted sample including all 10,419 firms and the second to the restricted sample including only those 3,834 firms that received some kind of public support.

5 and finally Section 6 concludes.

2 Literature

The nascent literature on the pandemic and its devastating effects deals with several aspects of the crisis. These range from the consequences for individuals and firms, health of the population, spread of the disease, effects on the overall economy or the effects of different forms of state aid. Our research contributes to this quickly evolving literature.

One strand of literature uses high-frequency data to assess the effect of the lockdown in real time. These papers employ for instance transaction data from credit or debit card purchases (Chetty et al., 2020), hourly electricity load (Janzen & Radulescu, 2020), text data from earnings reports (Hassan et al., 2020). These studies find a pronounced negative effect of the lockdown on economic activity.

A second strand of literature employs survey data to assess the impact of the pandemic and the implemented measures on employment and business activities. Adams-Prassl et al. (2020) use real time survey evidence from the UK, US and Germany and show that the immediate labour market impacts of the pandemic differ substantially between countries, with anglophone countries experiencing much more employment ties cut. Furthermore, they find that employees on temporary contracts have been more likely to lose their jobs and women and less educated workers are more affected by the crisis. Bartik et al. (2020) conduct a survey on 5,800 small business in the US during the spring lockdown. Their findings highlight the financial fragility of many small businesses, and how deeply affected they are by the pandemic. They show that 43% of businesses were temporarily closed and that employment had fallen by 40%. These results imply that many of these firms had little cash on hand at the start of the pandemic, which means that they either had to cut expenses, take on additional debt, or declare bankruptcy. This suggests that without financial assistance, the firms are likely to fail. While the above mentioned papers analyse

the effects for developed countries and small businesses, Beck et al. (2020) focus on listed firms in emerging economies,[2] and find that these reacted by reducing investments rather than payrolls.

A third strand of related papers scrutinize the effects of different government policies to cushion the effects of the pandemic. These are mostly single country studies, using information on countries such as the United States (Cororaton & Rosen, 2020), (Granja et al., 2020), Italy (Core & De Marco, 2020), Portugal (Kozeniauskas et al., 2020) or Switzerland (Brülhart et al., 2020). Financial support to US firms in the form of the Paycheck Protection Program (PPP - a USD 349 bn fund aimed at keeping workers employed by providing forgivable loans to businesses) does not seem to have achieved its scope since the short- and medium-term employment effects of the program were small compared to the program's size. In addition, many firms used the loans to make non-payroll fixed payments and build up savings buffers (Granja et al., 2020). Furthermore, 17.7% of borrowers chose to return their loans after receiving public backlash and some firms who borrowed faced negative stock returns upon PPP loan announcement (Cororaton & Rosen, 2020). The relatively low success of Corona government-backed loans relative to labour-income support measures is also documented by Brülhart et al. (2020) for Switzerland. They find a better performance of labour-income support measures among small businesses and that recourse to government-backed loans was driven to a large extent by firms' prior history of indebtedness.

Compared to the above mentioned papers, our study includes enterprises of different sizes from a large number of countries and also information of firms' pre-crisis characteristics that may also affect the results and are thus important to account for. In addition, we compare the impact of different support instruments such as wage subsidies, cash transfers, payment deferral or access to credit instead of assessing the effectiveness of one instrument only.

Recent working papers that also employ the COVID-19 Follow-Up Survey to assess the short-term impact of the pandemic on businesses include Apedo-Amah et al. (2020), Cirera et

[2]These are Bangladesh, Indonesia, Malaysia, Pakistan, Philippines, Saudi Arabia, South Africa, Thailand, Turkey and Vietnam

al. (2021), Bosio et al. (2020), Nelson (2021), and Grover & Karplus (2021). The first two focus on developing countries and report persistent negative impacts on sales and employment adjustments mainly along reduction of hours worked and leave of absence (Apedo-Amah et al., 2020) and identify mismatches between policies provided and policies most sought (Cirera et al., 2021). Bosio et al. (2020) estimate the survival of 7,000 firms in high- and middle-income countries and find that the median survival time ranges between 8 and 19 weeks. In addition, firms suffer from illiquidity regardless of productivity levels, age or size. Singling out the labour market effect of each containment measure is at the heart of Nelson (2021). His research paper looks at firms in 20 emerging countries[3] and finds that whereas containment and closure policies negatively affected permanent jobs and total hours worked at the firm level, temporary employment was less affected. Furthermore, policies directed at closure of public events had significant negative effects across all employment categories. Grover & Karplus (2021) employ the World Bank Enterprise Survey to analyse the impact of pre-crisis management practices on subsequent post-COVID-19 outcomes, such as firm's ability to adjust their products or shift sales online.

Whereas these studies mostly employ only data from the COVID-19 Follow Up Survey and primarily show a number of correlations, we enrich our analysis with information from the original World Bank Enterprise Surveys as well. This additional data allows us to explicitly control for pre-crisis firm specific observable characteristics that may affect the results. Furthermore, appropriate econometric approaches that account for the distributional assumptions allow us to identify the underlying effects more accurately.

3 Data

We draw on two main data sources for this research project. First, data from the World Bank Enterprise Survey (WBES) and the first wave of the World Bank Follow-up Survey

[3]These include 7 European and 13 non-European countries: Albania, Belarus, Bulgaria, Chad, Cyprus, El Salvador, Greece, Guatemala, Guinea, Honduras, Jordan, Mongolia, Morocco, Nicaragua, Niger, Poland, Slovenia, Togo, Zambia, Zimbabwe.

on COVID-19[4] and second, information from the Oxford COVID-19 Government Response Tracker.

The regular WBES are establishment level surveys where business owners and top managers are asked about the characteristics, climate and constraints of their business operations in the respective countries. They are constructed on a stratified random sample of small (less than 20 employees), medium (20-99 employees) and large establishments (over 100 employees). The COVID-19 follow-up surveys were conducted in countries with recent enterprise surveys and measure the impact of the pandemic on businesses using the same methodology as the WBES. The questionnaire collects information on sales, liquidity, operations of the business, labor adjustments or expectations about the future[5].

Overall, the follow-up study was implemented in 42 countries, where the original WBES was conducted in 2019 or 2018. For the purpose of our study we focus on 23 European countries including the Russian Federation. The countries we consider are Albania, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Georgia, Greece, Hungary, Italy, Latvia, Lithuania, Malta, Moldova, Poland, Portugal, Romania, Russian Federation, Serbia, Slovak Republic, and Slovenia. Overall our sample covers 10,419 firms that answered both questionnaires, varying between 171 firms (Cyprus) to 1,191 firms (Russian Federation) per country (see Table 1). The sample covers small, medium and large formal businesses across the main sectors of the economy (D: manufacturing (ISIC 3.1 Rev. 15-37), F: construction (ISIC 3.1 Rev. 45), G: retail and wholesale trade (ISIC 3.1 Rev. 50-52), H: facility sector (ISIC 3.1 Rev. 55), I: transport, storage and communication (ISIC 3.1 Rev. 60-64), and one business division of sector K: computer related services (ISIC 3.1 Rev. 72)). Table 1 shows that the majority of the surveyed firms (55%) belong to the manufacturing sector, followed by the retail and wholesale trade sector (28% of firms). Hotels and restaurants represent around 5% of enterprises. Information on the strictness of lockdown measures in reaction to COVID-19 is retrieved from the Oxford COVID-19 Government

[4]https://www.enterprisesurveys.org/en/covid-19.

[5]We provide examples of the most important questions for our analysis in Figure A1 in the Appendix.

Table 1

Country	Year of Baseline Survey	Month and Year of Follow-up Survey	No. of Obs.	Business sector					
				D (15-37)	F (45)	G (50-52)	H (55)	I (60-64)	K (72)
Albania	2019	June 2020	347	132	27	123	43	19	3
Belarus	2018	August 2020	551	314	36	163	10	19	9
Bosnia and Herzegovina	2019	February - March 2021	241	86	23	104	11	13	4
Bulgaria	2019	July - September 2020	559	326	41	134	17	37	4
Croatia	2019	September 2020	351	133	35	129	27	21	6
Cyprus	2019	June 2020	171	65	24	63	13	6	0
Czech Republic	2019	September - October 2020	405	252	25	81	18	16	13
Estonia	2019	October 2020	272	100	51	80	19	20	2
Georgia	2019	June 2020	514	182	45	170	92	23	2
Greece	2018	June - July 2020	532	277	35	162	41	12	5
Hungary	2019	September 2020	630	378	37	164	23	21	7
Italy	2019	May - June 2020	453	277	23	108	28	9	8
Latvia	2019	October - November 2020	244	83	29	105	8	16	3
Lithuania	2019	October 2020	214	79	16	85	16	14	4
Malta	2019	September - October 2020	196	67	9	77	11	24	8
Moldova	2019	May 2020	286	110	34	121	3	14	4
Poland	2019	July - August 2020	1,005	738	70	143	18	22	14
Portugal	2019	September - October 2020	820	605	16	144	44	10	1
Romania	2019	August - September 2020	532	327	35	125	11	23	11
Russian Federation	2019	June 2020	1,191	815	42	283	10	23	18
Serbia	2019	February 2021	318	114	33	131	11	20	9
Slovak Republic	2019	September - October 2020	338	154	18	113	22	18	13
Slovenia	2019	July - August 2020	249	93	27	76	18	24	11
Total			10,419	5,707	731	2,884	514	424	159

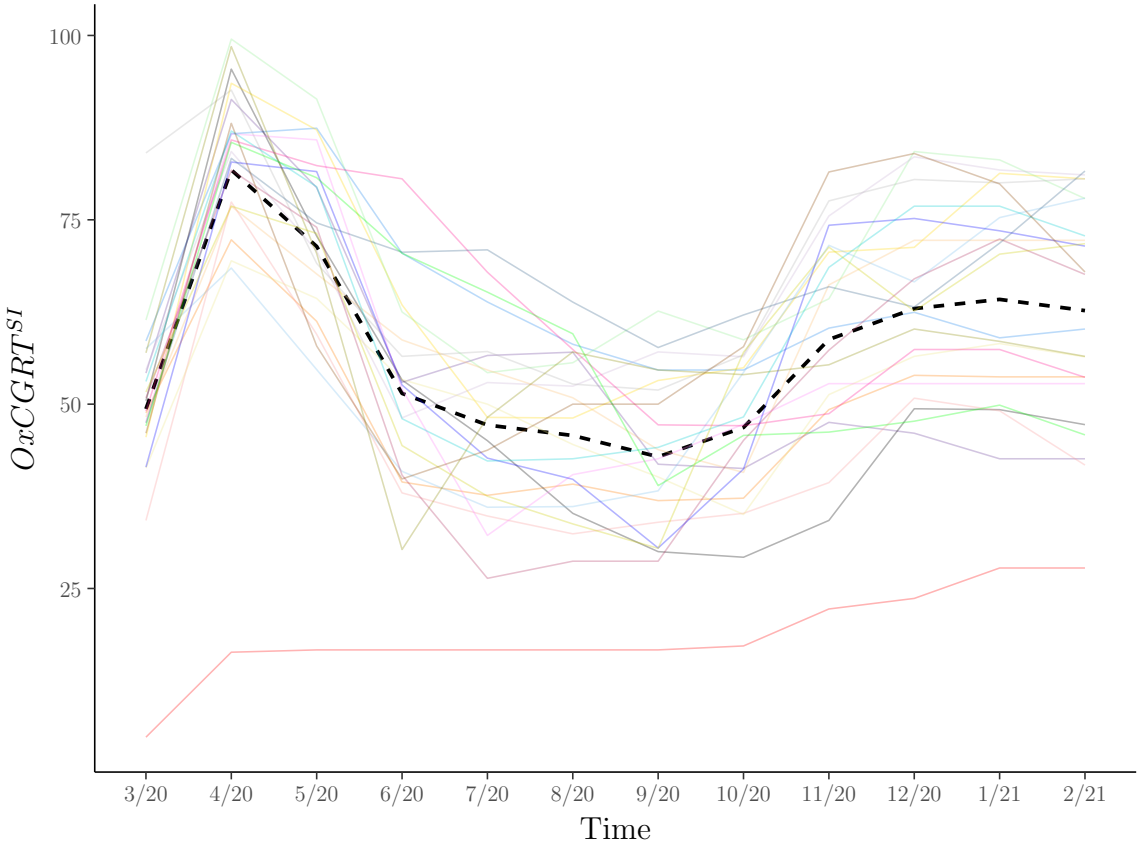
Notes: classification of business sections according to ISIC Rev. 3.1. D: Manufacturing; F: Construction; G: Wholesale and retail trade; H: Hotels and restaurants; I: Transport, storage and communications; K: Real estate, renting and business activities (here: only computer and related activities, ISIC Rev. 3.1 72). Corresponding division codes reported in parentheses.

Response Tracker(Hale et al., 2021), which provides a systematic way to track government responses to the pandemic and renders policy responses comparable across regions and jurisdictions. The project provides a total of 19 different indicators. In our analysis we only consider nine indicators related to containment, closure and health system policies[6]. Each indicator is ordinally scaled and scored based on the evaluation of publicly available data. For example, the indicator on international travel controls can take on integer values from zero to four, with zero representing no restrictions and a value of four being total border closure. Hence, for the regressions, the stringency index is defined as an additive unweighted index combining all aforementioned indicators capturing policies that were primarily designed to restrict individuals' behaviour[7].

[6]These are: school closing, workplace closing, cancellation of public events, restrictions on gatherings, closure of public transport, stay-at-home orders, restrictions on internal movements, international travel controls, and public information campaigns.

[7]See https://www.bsg.ox.ac.uk/research/research-projects/covid-19-government-response-tracker for more information on the calculation of the stringency index.

Figure 1: Evolution of the Oxford COVID-19 Government Response Tracker Stringency Index, 3/2020 - 2/2021



Notes: Each coloured solid line refers to the average monthly stringency index in one of our sampled countries. The black dashed line shows the pooled average monthly stringency index for all sampled countries.

Figure 1 plots the evolution of the monthly stringency index from March 2020 to February 2021. Most of the sampled countries exhibit the same time pattern, with very strict lockdown policies at the beginning of the pandemic, that were relaxed during the summer, and tightened again towards the end of the year 2020. The highest value during our observation period was reported in Georgia in April 2020, with an average monthly stringency index of 99.51. Only in Belarus policy measures to restrict the outbreak of SARS-CoV-2 were relatively liberal throughout the year. Therefore, it is of no surprise that the lowest average monthly stringency index during our observation period in all sampled countries was reported in Belarus in March 2020, with a value of 4.8. The only curtailment measure that

Table 2: Summary Statistics

	Obs.	Mean	Std. Dev.	Median	Min	Max
$OxCGRT^{SI}$	276	57.09	17.93	55.48	4.84	99.51
WBES Baseline						
Age	10,359	21.05	16.06	19	1	205
$\text{Owner}_{FemaleShare}$	10,419	19.40	33.14	0	0	100
$\text{Sales}_{ExportShare}$	10,324	17.30	30.73	0	0	100
$\text{Supply}_{ImportShare}$	10,020	34.87	36.29	20	0	100
Innovation (No = 1)	10,357	0.70	0.46	1	0	1
COVID-19 Follow-up ES						
%Δsales	9,676	-22.31	31.40	-20	-100	300
Closure (No = 1)	10,419	0.71	0.45	1	0	1
SaleChange (No = 1)	10,021	0.80	0.4	1	0	1
Employees	9,747	88.72	350.79	23	1	20,000
Layoff_{Share}	9,640	0.02	0.58	0	-32.33	1
Layoff	9,640	3.34	35.42	0	-630	1610
$\text{Overdue}_{Financial}$	9,538	0.10	0.30	0	0	1
Overdue_{Other}	9,937	0.33	0.47	0	0	1
Insolvency	10,032	0.02	0.14	0	0	1

Notes: The variable $OxCGRT^{SI}$ refers to the average monthly value of the stringency index.

was captured by the nine aforementioned indicators in Belarus during that month was a ban on arrivals from certain regions.

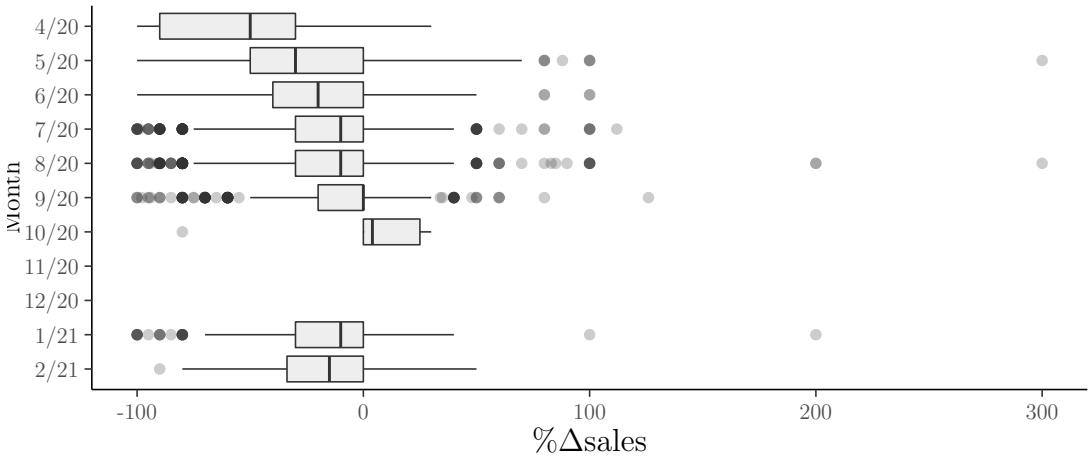
Table 2 presents summary statistics for the independent variables as well as the main dependent variables. The mean decrease in sales amounts to 22.3% but can even reach 100%. Firms laid off on average 3.34 employees, however some recorded even much larger layoffs whereas others even increased their workforce. The stringency index varies between a minimum of 4.84 and a maximum of 99.51 with a median of 55.48.

4 Response Stringency

4.1 Overall Impact on Firm Performance

One major objective of this study is to untangle the effects of COVID-19 related government response strictness on firm performance. For this purpose, we resort to the WBES Follow-up Survey's questions on year-on-year sales growth, which we consider an appropriate measure of firm performance (Figure A1 Panel (a) in the Appendix). In the questionnaire, firms are explicitly asked for a relative comparison of sales in the last completed month before

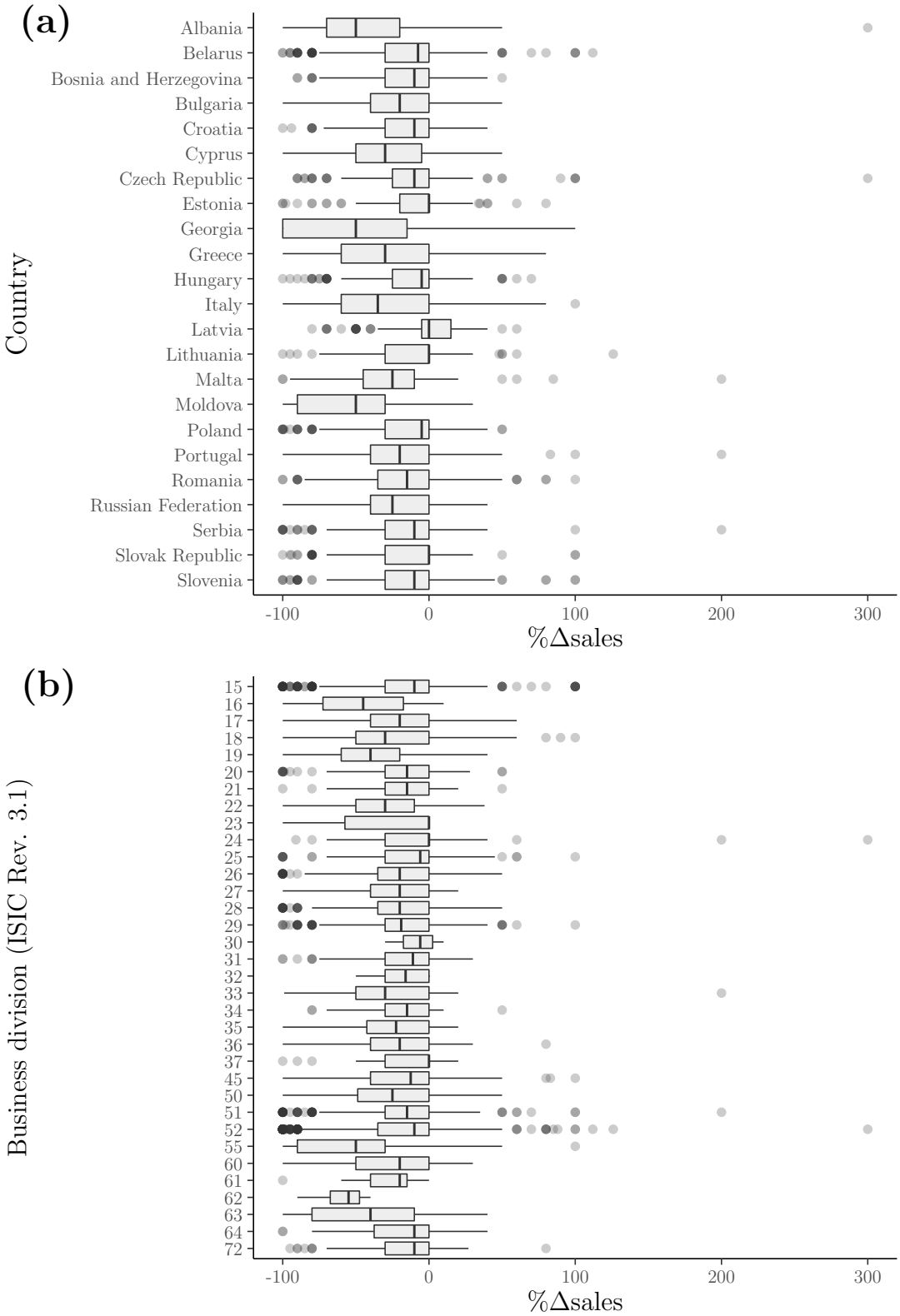
Figure 2: Changes in sales relative to the same month in the previous year, by month



the survey was conducted in 2020, with the same month in the previous year, therefore, automatically negating the effect of seasonality. Two main assumptions are necessary to ensure the validity of our estimates: (i) all changes in sales compared to the same month in the previous year were caused by pandemic-related government policies only (i.e. no year-on-year sales growth in the absence of COVID-19) and (ii) no systemic response bias in the reported values. While the first assumption may not hold on a case-by-case basis, we consider the endogenous sales growth of firms on average to be negligible given the short time period of one year.[8] We cannot rule out a systemic response bias which may impact the validity of the estimates. This is however a well-known potential source of bias when working with survey data in general. Figures 2 and 3 provide descriptive evidence of reported year-on-year sales growth across months, countries and economic divisions. Figure 2 shows that firms that were surveyed in May 2020, therefore providing information on sales in April 2020 relative to April 2019, report the steepest decline, with an average reduction in sales of 53.5 %. Reported mean year-on-year sales growth is considerably closer to zero if the COVID-19 follow-up survey was conducted during the later months of 2020 or earlier months of 2021.

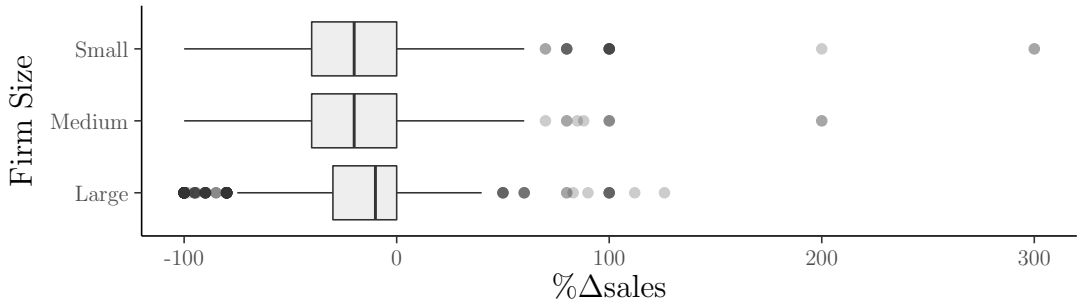
[8] A close look at the unprocessed data shows it is safe to assume that most of the year-on-year sales changes can be attributed to the pandemic. For example, five establishments in our sample more than tripled their sales compared to the same period in the previous year. All of these firms either manufacture or deal with pharmaceutical and/or medical products (i.e. ISIC 3.1 Rev. 2423, 3311, 5190, 5211).

Figure 3: Changes in sales relative to the same month in the previous year by (a) country and (b) division



Notes: description of ISIC Codes can be found under https://unstats.un.org/unsd/classifications/Econ/ISIC.

Figure 4: Changes in sales relative to the same month in the previous year, by firm size



Notes: firm size classifications according to the World Bank Enterprise Survey. Small firms employ less than 20 people, medium sized firms have 20-99 employees, and large firms have more than 100 full-time employees.

Figure 4 plots the reported year-on-year percentage changes in sales by company size. We follow the classification of the World Bank Enterprise Survey, that distinguishes between small (less than 20 employees), medium (20-99 employees) and large (over 100 employees) establishments. Reported mean reductions range from 17.4% for large establishments to even 25.3% for small sized firms. Panel (a) in Figure 3 shows year-on-year growth rates of sales by country. While Moldovan enterprises report an average reduction of 54.7%, firms in Latvia are the least affected, with an average year-on-year sales change close to zero. However, since the follow-up surveys were conducted at different points in time, and policy measures to cope with the pandemic vary across countries, the comparability of these descriptive unconditional differences in firm performance across jurisdictions is rather limited and calls for an in depth empirical analysis. Panel (b) in Figure 3 plots growth rates by business division (2-Digit ISIC Rev. 3.1). Air transport (62), hotels & restaurants (55), and supporting transport activities (63) report the largest reductions in sales with an average negative year-on-year sales growth of 60%, 55.5% and 44%, respectively. Descriptive statistics suggest that manufacturers of chemical products (24), computing machinery (30), and plastic products (25) are the least affected industry divisions in our sample.

While the temporal variation of the COVID-19 Follow-up Enterprise Survey may limit the explanatory power of descriptive cross-country evidence, it offers the advantage of greater variation in our data. We employ a fixed effects regression model to capture the impact of

the COVID-19 related lockdown policies on firms' performance in terms of sales changes:

$$\%\Delta sales_{ict} = \alpha_0 + \alpha_1 OxCGRT_{ct}^{SI} + \boldsymbol{X_i'A_2} + \boldsymbol{Y_i'A_3} + \theta_s + \zeta_c + \epsilon_{ict}, \tag{1}$$

where the dependent variable, $\%\Delta sales_{ict}$, refers to the reported percentage change in sales for company i in country c at time t relative to the same month in the previous year. The main independent variable of interest $OxCGRT_{ct}^{SI}$ denotes the average stringency index in country c at time t as communicated by the Oxford Covid-19 Government Response Tracker. While the stringency index reports daily changes in lockdown measures, firms in the WBES are asked to provide information on year-on-year sales growth for the last completed month. We construct an average monthly stringency index for every country in our sample and match it to the month that was referred to in the World Bank COVID-19 Follow-up Survey. Therefore, the corresponding coefficient α_1 measures the average percentage point change in year-on-year sales growth induced by a marginal change in containment measures. As a robustness check, we also employ the monthly maximum value of the stringency index in the respective countries. The vector $\mathbf{Y}$ includes additional information retrieved from the COVID-19 Follow-up Enterprise Survey, such as the number of full-time employees in December 2019, information on temporary closure of the establishment during the pandemic, and whether the firm adjusted its products, services or sales channels in reaction to COVID-19. $\mathbf{X}$ includes a set of individual pre-pandemic firm characteristics, such as firm age, share of sales that is exported directly or indirectly[9], share of input supplies that are of foreign origin, share of female ownership, and general innovative capabilities of the company[10]. We also include a full set of sector dummies θ_s and country fixed effects ζ_c to account for the heterogeneous impact of lockdown policies on industry sectors and unobservables across countries that were not captured by the stringency index respectively.

[9]For some service establishments (i.e. hotels), direct sales to foreign customers are defined as direct export. Services sold to foreigners via intermediaries are defined as indirect exports.

[10]Innovative capability of the firm is indicated by a dummy variable that is equal to unity if the company introduced new or improved products or services in the three years prior to the baseline survey year.

4.2 Effect Heterogeneity

Looking at the raw data we suspect two main sources of firm-level effect heterogeneity. Figure 4 suggests a differential impact of the containment policies according to firm size. To test whether the lockdown policies affected small or medium sized enterprises differently, we first define a multilevel dummy which follows the size definitions of the WBES. We then introduce an interaction term capturing the heterogeneous effect of these lockdown policies by firm size. Since we also suspect effect heterogeneity across sectors, as indicated by Figure 3 Panel (b), we estimate an alternative specification where we interact the business sector dummies θ_s with the average stringency index in country c at time t as reported by the Oxford COVID-19 Government Response Tracker. By doing so, we can analyze if an increase in the strictness of containment and closure policies impacted some business sectors disproportionately. We use the corresponding business sections (D-K) instead of the 2-Digit business divisions that we show in Figure 3 Panel (b), to avoid a too extensive disaggregation of the results.

4.3 Results

We report the regression results of our main specification in Table 3. Columns (1) - (3) present the results employing the monthly average value of the stringency index, while columns (4) - (6) report the results using the maximum monthly value as a proxy for lockdown strictness in any given month. Columns (1) and (4) show the results of the main specification without the interaction terms. We cluster standard errors at the country-level. A one point increase in lockdown stringency decreases average year-on-year sales growth by around 0.64 and 0.59 percentage points in these specifications. Put differently, if there was a complete lockdown (i.e. $OxCGRT^{SI} = 100$) one would expect monthly sales to decrease relative to the same period in the previous year on average by 63.9%, or 59.1%, ceteris paribus. Firms that export a higher share of their goods experience a steeper decline in sales, as suggested by the negative and highly significant coefficient of $Sale_{ExportShare}$. This effect is probably largely driven by international trade restrictions as well as travel bans. However,

Table 3: Regression Results: Response Stringency

	Dependent variable:					
	%Δsales					
	(1)	(2)	(3)	(4)	(5)	(6)
$OxCGRT^{SI}$	−0.639***	−0.533***	−0.621***	−0.591***	−0.499**	−0.550***
	(−7.557)	(−5.382)	(−7.210)	(−3.350)	(−2.974)	(−2.982)
FirmSize_M		−0.773			−0.166	
		(−0.332)			(−0.069)	
FirmSize_S		−1.323			−0.131	
		(−0.399)			(−0.035)	
$\text{Sales}_{ExportShare}$	−0.048***	−0.043***	−0.044***	−0.048***	−0.043***	−0.043***
	(−4.050)	(−3.743)	(−3.965)	(−4.054)	(−3.654)	(−3.841)
$\text{Supply}_{ImportShare}$	−0.004	−0.005	−0.005	−0.004	−0.004	−0.004
	(−0.445)	(−0.493)	(−0.501)	(−0.384)	(−0.463)	(−0.414)
log(age)	−0.316	−0.157	−0.384	−0.340	−0.183	−0.411
	(−0.839)	(−0.404)	(−1.012)	(−0.908)	(−0.474)	(−1.092)
log(employees)	2.616***		2.591***	2.637***		2.605***
	(6.119)		(6.198)	(6.041)		(6.132)
$\text{Owner}_{FemaleShare}$	−0.023**	−0.025**	−0.023**	−0.023**	−0.026**	−0.023**
	(−1.979)	(−2.115)	(−2.000)	(−1.998)	(−2.125)	(−1.990)
Innovation = No	−1.523*	−1.701**	−1.478*	−1.490*	−1.691**	−1.440*
	(−1.750)	(−1.977)	(−1.700)	(−1.710)	(−1.964)	(−1.663)
Closure = No	13.802***	13.821***	14.229***	13.827***	13.837***	14.276***
	(9.906)	(9.907)	(10.758)	(9.910)	(9.957)	(10.718)
SaleChange = No	−6.657***	−6.782***	−6.492***	−6.691***	−6.834***	−6.531***
	(−4.059)	(−4.199)	(−4.150)	(−4.077)	(−4.218)	(−4.159)
ISIC_F	0.377	0.214	2.285	0.327	0.189	4.471
	(0.223)	(0.127)	(0.581)	(0.192)	(0.113)	(1.229)
ISIC_G	4.134***	3.905***	6.486***	4.146***	3.921***	6.824***
	(5.249)	(4.796)	(3.609)	(5.278)	(4.847)	(3.987)
ISIC_H	−25.974***	−26.108***	−1.800	−25.960***	−26.073***	−0.752
	(−5.671)	(−5.666)	(−0.273)	(−5.663)	(−5.659)	(−0.120)
ISIC_I	−9.664***	−9.843***	−10.366**	−9.647***	−9.838***	−10.025**
	(−4.369)	(−4.514)	(−2.036)	(−4.363)	(−4.507)	(−1.966)
ISIC_K	0.711	0.439	−7.469*	0.568	0.283	−5.498
	(0.281)	(0.171)	(−1.653)	(0.224)	(0.109)	(−1.182)
$OxCGRT^{SI}$:FirmSize_M		−0.082**			−0.088***	
		(−2.382)			(−2.681)	
$OxCGRT^{SI}$:FirmSize_S		−0.135**			−0.147***	
		(−2.437)			(−2.578)	
$OxCGRT^{SI}$:ISIC_F			−0.035			−0.071
			(−0.436)			(−1.032)
$OxCGRT^{SI}$:ISIC_G			−0.042			−0.044*
			(−1.441)			(−1.753)
$OxCGRT^{SI}$:ISIC_H			−0.411***			−0.400***
			(−3.123)			(−3.508)
$OxCGRT^{SI}$:ISIC_I			0.016			0.010
			0.137)			(0.089)
$OxCGRT^{SI}$:ISIC_K			0.168*			0.119
			(1.790)			(1.296)
Constant	4.695	12.192	4.740	1.880	10.569	−0.233
	(0.582)	(1.490)	(0.604)	(0.122)	(0.728)	(−0.015)
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8,888	8,888	8,888	8,888	8,888	8,888
R^2	0.240	0.240	0.244	0.239	0.239	0.243
Adjusted R^2	0.237	0.237	0.240	0.236	0.236	0.240
Residual Std. Error	27.132 (df = 8851)	27.134 (df = 8848)	27.070 (df = 8846)	27.156 (df = 8851)	27.148 (df = 8848)	27.084 (df = 8846)
F Statistic	77.643*** (df = 36; 8851)	71.704*** (df = 39; 8848)	69.618*** (df = 41; 8846)	77.073*** (df = 36; 8851)	71.414*** (df = 39; 8848)	69.309*** (df = 41; 8846)

Notes: *p<0.1; **p<0.05; ***p<0.01. All models are estimated using OLS. t-values reported in parentheses. Standard errors are clustered at the country-level.

we don't find evidence for a supply shock induced by international restrictions. Having a higher share of imported production inputs, does not significantly impact firm performance.

Our results indicate the existence of gender-based differences in economic consequences of the pandemic. An increase in female ownership by one percentage point is associated with an average decrease in sales by 0.02 percentage points. The coefficient is statistically significant in all model specifications. Looking at an extreme case, if a firm is 100% female-owned, the reduction in sales is 2.3 percentage points higher than for businesses that are exclusively owned by men. This effect has also been documented by Graeber et al. (2021), who find that self-employed women are 35% more likely to experience income losses than their male counterparts in Germany due to the pandemic. This can be mainly explained by the fact that women disproportionately work in industries that are more severely affected by the pandemic. In our data, the share of female ownership is with 25.7% much higher in the facility sector than in the construction sector (11.6%). Furthermore, the share of female ownership amounts to 12.8% in large firms and reaches even 24.1% in small firms. Since our findings reveal that small firms and firms belonging to the facility sector were most severely hit, it is not surprising that female self-employed were disproportionately affected.

We document that general innovative abilities make firms more resilient to changes in government response stringency to the pandemic. Establishments that reported product or service innovation during the last three years before the baseline WBES was conducted, display on average a 1.52 percentage point lower reduction in sales. Perhaps unsurprisingly, establishments that were not permanently or temporarily closed due to COVID-19 report a 13.8 percentage point lower average decline in sales than firms that were shut down.

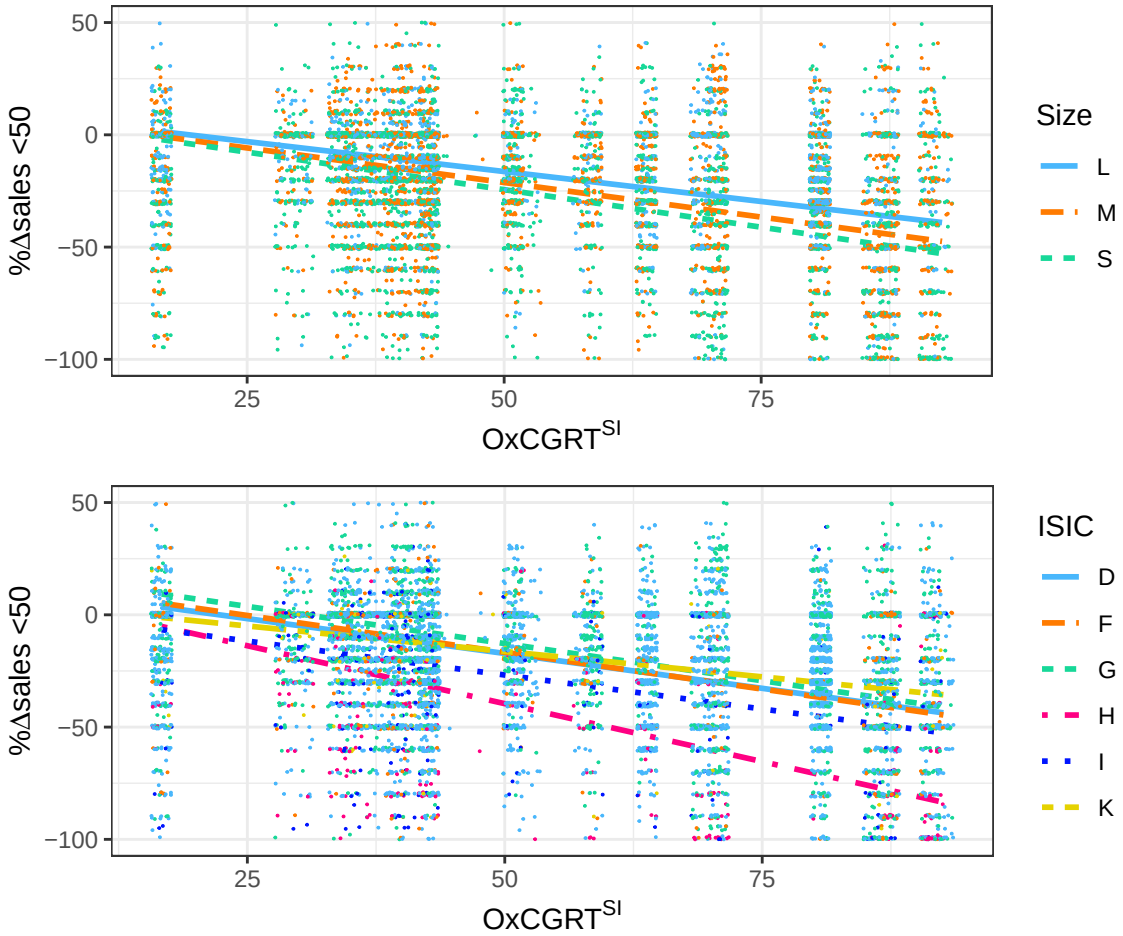
We find strong evidence for heterogeneous effects across firm size and business sectors. Small sized establishments were disproportionately impacted by the containment and closure measures. While a one percentage point increase in the stringency index leads to a sales decrease by 0.53 percentage points for large enterprises, it decreases sales of small sized firms by 0.67 (= (-0.53) + (-0.14)) percentage points. Differences in sales changes between

large and medium sized firms are closer to zero but still statistically significant. Models employing the maximum monthly value of the stringency index as a proxy for the strictness of lockdown policies display similar effects. Columns (3) and (6) provide evidence of effect heterogeneity across sectors. While, on average, businesses operating in the manufacturing sector ($ISIC_D$) experience a decline in sales relative to the same period in the previous year of 35.5 percent[11], businesses operating in the facility sector experience a stronger reduction of even 58.9 per cent[12]. Of course, due to effect heterogeneity, the absolute difference in year-on-year sales decline between both business sectors is even more pronounced assuming a full lockdown (i.e. $OxCGRT^{SI} = 100$). The results seem plausible, because containment and closure policies are mainly aimed at restricting mobility and social gatherings, both of which the facility sector is highly dependent on. Differences between the decline in the manufacturing sector and other business sectors are not statistically significant. Therefore, our results indicate that these business sectors are impacted proportionally by an increase in lockdown strictness.

In the following, we illustrate effect heterogeneity of government response stringency to COVID-19. Figure 5 plots the previously estimated interaction effects of two of our models (Table 3, columns (2) and (3)). Each dot represents one of the firm-level observations, grouped by firm size and business division, respectively. As shown in Table 3, the slope coefficient between large and small enterprises is significantly different, as well as the difference in slopes between firms in the facility sector and firms in the manufacturing sector. The effect heterogeneity results in an increasing discrepancy in the reaction of sales between firms operating in the facility versus firms in other economic sectors with higher levels of the stringency index. We provide additional model specifications and robustness checks in Table A1 in the Appendix. First, instead of following the arbitrarily chosen WBES firm size classifications, we interact a continuous measure of firm size (log(employees)) with our independent variable of interest to validate our findings regarding size-related effect hetero-

[11] 57.1*0.621 = 35.46; 57.1 corresponds to the average value of the stringency index.
[12] 57.1*(0.621+0.411) = 58.93.

Figure 5: Interaction Plot: Response Stringency



Notes: Figure plots predicted values of interaction effects using the average value of the stringency index (Table 2, columns (2) and (3)). Firm size classifications according to the World Bank Enterprise Survey. Small firms employ less than 20 people, medium sized firms have 20-99 employees, and large firms have more than 100 full-time employees. Classification of business sections according to ISIC Rev. 3.1. D: Manufacturing; F: Construction; G: Wholesale and retail trade; H: Hotels and restaurants; I: Transport, storage and communications; K: Real estate, renting and business activities, here: only computer and related activities, ISIC Rev. 3.1 72

geneity. Second, we construct a dummy variable that indicates if an establishment does not export or import at all, to check for robustness of the impact on internationally operating firms. The results confirm our findings that exporting firms report significantly higher declines in sales than non-exporting companies. Third, we construct a dummy variable that is equal to unity if the establishment has no female owners. The coefficient supports the findings of a higher economic burden of the pandemic for female self-employed[13]. Another

[13]We also check for potential sources of effect heterogeneity other than sector affiliation and firm size, such as exporting status and female ownership, however, we don't find any further significant interaction terms. Regression results are available upon request.

potential concern regarding our results is that they are driven by countries that followed a different path in containing the spread of the pandemic. Looking at Figure 2 we identify Belarus as a potential threat to the validity of our estimates. To address this concern we re-estimate our main specification outlined in equation (1) excluding this country. The results of using this alternative sample are reported in Table A2 in the Appendix. We also check if our results are biased by countries that were questioned in the earlier months of 2021, therefore reporting sales changes relative to the same month in 2020 (i.e. Bosnia and Herzegovina and Serbia). The main coefficients retain their sign, magnitude and significance even in these alternative specifications.

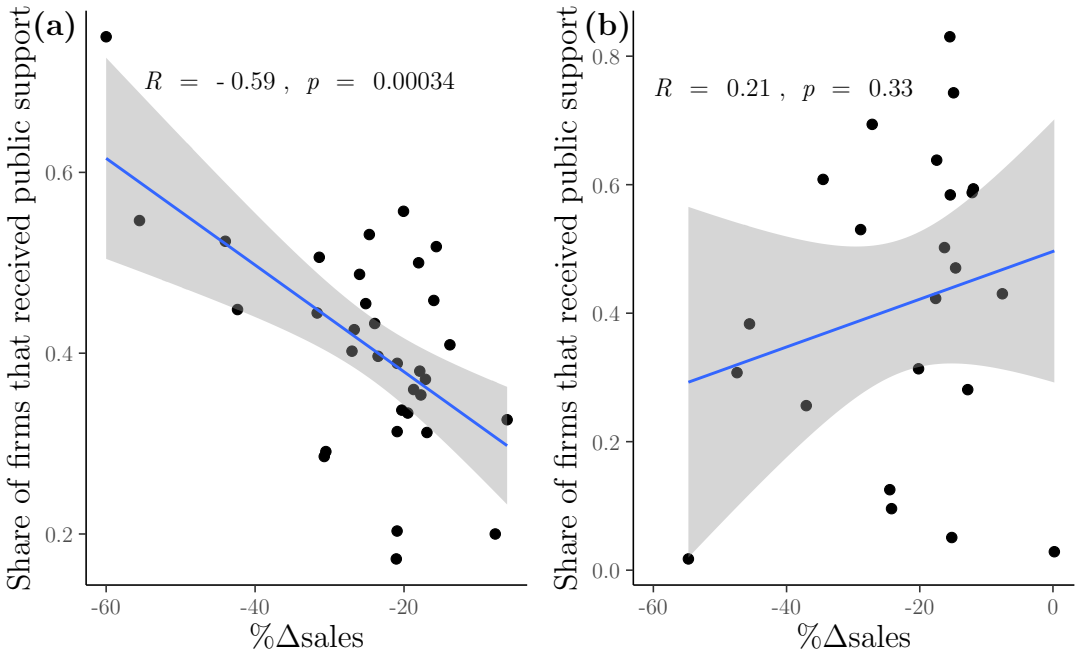
5 Government Support Policies

5.1 Policy Targeting

To cushion the negative repercussions documented above, many countries introduced a number of support policies. In the following, we assess the effectiveness of these measures along a number of different dimensions. Overall 3,834 out of 10,419 firms in our sample received public support, 623 firms expected to receive public support within the next three months, 5,542 firms did not get any public support, and 420 firms did not answer the respective survey question. The COVID-19 Follow-up Enterprise Survey distinguishes between five different policy support schemes: direct cash transfers, deferral of payments, credit access, fiscal exemptions and wage subsidies. We provide some descriptive evidence of targeting effectiveness of government support policies, that aimed at relieving economic distress for companies during the COVID-19 pandemic[14]. Figure 6 Panel (a) plots the correlation between reported average percentage reduction in sales and the share of companies that received public support across sectors. Each dot in the scatterplot represents one business division covered by

[14]See Cirera et al. (2021) for a more detailed analysis of targeting effectiveness based on the COVID-19 Follow-up World Bank Enterprise Survey.

Figure 6: Target effectiveness of public support by (a) division and (b) countries



the WBES. There is a strong and statistically significant correlation of -0.59 between receiving public support and operating in a specific division that was significantly impacted by the containment and closure policies. 75% of firms operating in the air transport business division (ISIC 3.1 Rev. 62), the most affected industry division in our sample with an average year-on-year sales growth of -60%, received public support. However, the descriptive evidence also suggests that some business divisions, such as manufacturers of motor vehicles, trailers and semi-trailers (ISIC 3.1 Rev. 34) may have been overcompensated. Companies in these divisions experienced a decline in sales by only 20.1% on average, but 56% received public support to cope with the negative economic consequences of the pandemic. Panel (b) of Figure 6 shows that there is no significant correlation between the share of companies that received public support in any given country and the average mean reduction in sales in the same country. There is a huge discrepancy in public support schemes across countries. In our sample only 1.7% of Moldovan firms received public support during the first months of the pandemic, whereas 74% of Slovenian firms and 83% of Serbian firms received any form

of public support[15].

5.2 Policy Outcomes

In this section we provide some preliminary evidence on the short-term outcomes of government support schemes during the COVID-19 pandemic. We run the following regression on a restricted sample of firms that received public support in order to assess which particular public support scheme was the most effective in helping firms to cope with the negative economic consequences of the lockdown :

$$O_{ic} = \beta_0 + \sum_{k=1}^{5} \beta_k Support_{ik} + \beta_6 OxCGRT_{ic}^{SI} + \beta_7 Days_i + \beta_8 OxCGRT_{ic}^{SI} \times Days_i + \boldsymbol{X_i'B_9} + \boldsymbol{Y_i'B_{10}} + \theta_s + \zeta_c + \epsilon_{ic}, \quad (2)$$

where O_{ic} denotes the dependent variables of interest, that are either related to *financial* outcomes (i.e. probability of filing bankruptcy, delaying payments due to COVID-19, or defaulting on financial obligations) or *labor* outcomes (i.e. share of workers laid off or count of workers laid off). The dummy variable $Support_{ik}$ is equal to unity if firm i reports that it received a specific type of public support (such as possibility to defer payments, cash transfers, fiscal exemptions, wage subsidies or access to credit) and thus captures the effect of each specific government support instrument. Therefore, $\beta_1 - \beta_5$ denote our main coefficients of interest. As opposed to the questions on year-on-year sales growth, survey questions on labor, finance, and policies do not refer to a specific time period. Hence, we estimate the average daily lockdown stringency for every company i, that is defined as the average value of the Oxford COVID-19 Government Response Tracker stringency index between the day the first measures in country c were introduced and the day the follow-up

[15]One could argue that these differences are mainly due to the different points in time the survey was undertaken. However, if we compare countries where the survey was conducted during the same months we still find large discrepancies between countries (e.g. 60.8 % of Cypriot establishments received public support, but only 30.7 % of Albanian companies in our sample. Both surveys were conducted in June 2020.)

interview was conducted. As an alternative we also use the maximum value of the stringency index during that exact time period. In addition, we interact the number of days with our stringency measure, since we assume that the negative economic consequences increase with the number of days between the interview took place and the first lockdown measures were introduced. The vectors **X** and **Y** include the same variables as introduced in the previous sections. We again include full sets of fixed effects to control for unobserved differences in policy schemes between countries and sectors.

5.2.1 Labor Market Outcomes

We employ two different measures to compare the effectiveness of the public support schemes on labor market outcomes: (i) the share of employees laid off and (ii) the number of employees laid off. First, we compute the share of employees a firm laid off by taking the difference between the number of employees the company employed pre-pandemic and the number of employees the firm reported in the Follow-up Survey (Figure A1 Panel (b) in the Appendix), divided by the number of employees pre-pandemic. We exclude all establishments that received public support and increased their workforce since the focus of our analysis lies on the companies in need of public support[16]. We start our analysis with estimating a fixed-effects linear regression model as laid out in equation (2). Since the dependent variable is bounded between 0 and 1, we would impose arbitrary restrictions on the range of variation in our exogenous variables by simply estimating a linear model. Furthermore, using a linear specification for the conditional mean, may not capture non-linearities in a correct manner. Therefore, we employ a quasi maximum likelihood estimator, as suggested by Papke &

[16] i.e. $\text{Layoff}_{share} < 0$. In total 431 companies receive public support and report an increase in the number of employees.

Wooldridge (1996), to estimate the following fractional response model:

$$\text{Layoff}_{share} = \Phi(\beta_0 + \sum_{k=1}^{5} \beta_k Support_{ik} + \beta_6 OxCGRT_{ic}^{SI} + \beta_7 Days_i + \beta_8 OxCGRT_{ic}^{SI} \times Days_i + \boldsymbol{X_i'B_9} + \boldsymbol{Y_i'B_{10}} + \theta_s + \zeta_c), \quad (3)$$

where Φ is specified as a logistic function (i.e. $\Phi(x) = \frac{exp(x)}{1+exp(x)}$).

We report the results of the model estimating the impact of public support policies on one of our labour market outcomes of interest in Table 4. Columns (1) and (3) display the results of a simple linear regression model. Columns (2) and (4) present the average marginal effects of the logit quasi maximum likelihood model. Columns (1), (2) and (5) use the average value of the stringency index, whereas in the remaining columns we report the

Table 4: Regression Results: Share of workers laid off

	Dependent variable:					
	Layoff_{share}					
	(1)	(2)	(3)	(4)	(5)	(6)
	(OLS)	(QMLE)	(OLS)	(QMLE)	(OLS)	(OLS)
Cash transfer = Yes	−0.010	−0.010	−0.010	−0.009	0.013	0.009
	(−1.378)	(−1.248)	(−1.435)	(−1.301)	(0.313)	(0.219)
Deferral of payments = Yes	−0.023***	−0.022***	−0.023***	−0.022***	−0.072*	−0.073*
	(−2.609)	(−3.180)	(−2.607)	(−3.179)	(−1.759)	(−1.755)
Credit access = Yes	0.004	0.005	0.004	0.005	0.003	0.003
	(0.749)	(1.012)	(0.755)	(1.026)	(0.278)	(0.229)
Fiscal exemptions = Yes	−0.003	−0.005	−0.003	−0.005	−0.074	−0.075
	(−0.364)	(−0.570)	(−0.383)	(−0.588)	(−1.075)	(−1.086)
Wage subsidies = Yes	−0.025**	−0.023***	−0.025**	−0.023***	0.088	0.086
	(−2.272)	(−2.582)	(−2.308)	(−2.618)	(0.893)	(0.874)
Stringency controls	Yes	Yes	Yes	Yes	Yes	Yes
Baseline firm controls	Yes	Yes	Yes	Yes	Yes	Yes
Follow-up firm controls	Yes	Yes	Yes	Yes	Yes	Yes
Sector fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,445	3,445	3,445	3,445	3,933	3,933
R^2	0.172	0.221	0.172	0.222	0.022	0.022

Notes: *p<0.1; **p<0.05; ***p<0.01. Columns (1), (3), and (5)-(6) are estimated using OLS. Columns (2) and (4) are estimated using quasi maximum likelihood estimation. Columns (1)-(4) employ the restricted sample, where $\text{Layoff}_{share} \geq 0$. t-values reported in parentheses. Standard errors are clustered at the country-level.

regression results using the maximum value.

Results indicate that the deferral of payments (i.e. credit, rent, mortgage, interest, and rollover of debt) as well as wage subsidies were the most effective policies with respect to labor market outcomes in terms of the share of laid off employees. The coefficients of payments deferral are negative and highly significant in all model specifications, the coefficients of wage subsidies are significant at the 1% level in the fractional logit model, and significant at the 5% level in the linear model specification. The share of laid of workers in total employees is by 2.3 percentage points lower (Table 4, column (2)) in firms that received wage subsidies compared to other forms of public support. A similar interpretation applies to the deferral of payments.

As an additional robustness check we estimate a linear regression model using the unrestricted sample (i.e. including companies that increased their labor force and still received public support). We present the results in columns (5) and (6) of Table 4. While the model fit is significantly lower, the coefficient for the deferral of payments is still significant whereas the coefficient pertaining to wage subsidies loses its significance.

We employ the count of workers laid off as an alternative dependent variable and report the results of the corresponding regressions in Table 5. We estimate three different model specifications: Linear regression[17], Poisson model, and Negative Binomial model. The latter are adequate to avoid estimation bias due to misspecification of the distributional assumptions. Columns (1)-(3) and column (7) report the results using the average stringency index, the other columns show the estimates if we employ the maximum value of the stringency index. The Poisson model assumes that the mean and the variance are equally distributed. However, in case of overdispersed count data (conditional variance is greater than the conditional mean), the Negative Binomial model may represent a suitable alternative. A simple test for overdispersion (Cameron & Trivedi, 1990) provides evidence in favor of using a Neg-

[17]In the case of OLS estimation, we use a convenience function that provides a continuity corrected logarithm. More specifically, we set O_{ic} = log(layoff + 1 - min(layoff)).

Table 5: Regression Results: Number of workers laid off

	Dependent variable:							
	Layoff							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	(OLS)	(P)	(NB)	(OLS)	(P)	(NB)	(OLS)	(OLS)
Cash transfer = Yes	−0.087	−0.015	−0.233**	−0.089	−0.049	−0.234**	0.001	0.001
	(−1.337)	(−0.074)	(−2.276)	(−1.379)	(−0.235)	(−2.310)	(0.961)	(0.939)
Deferral of payments = Yes	−0.167***	−0.242***	−0.258***	−0.168***	−0.236***	−0.260***	0.0001	0.0001
	(−4.093)	(−2.929)	(−2.628)	(−4.079)	(−2.789)	(−2.656)	(0.428)	(0.422)
Credit access = Yes	−0.016	0.287**	0.067	−0.015	0.276**	0.068	0.001	0.001
	(0.297)	(2.035)	(1.082)	(0.295)	(2.060)	(1.010)	(1.160)	(1.154)
Fiscal exemptions = Yes	−0.098**	−0.162	−0.203**	−0.099***	−0.159	−0.203**	−0.00002	−0.00002
	(−2.573)	(−1.361)	(−2.526)	(−2.634)	(−1.251)	(−2.549)	(−0.176)	(0.264)
Wage subsidies = Yes	−0.178**	−0.454*	−0.413***	−0.181**	−0.462*	−0.414***	0.001	0.001
	(−2.066)	(−1.674)	(−3.849)	(−2.098)	(−1.703)	(−3.888)	(1.026)	(1.007)
Stringency controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Baseline firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Follow-up firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,445	3,445	3,445	3,445	3,445	3,445	3,933	3,933
R^2	0.258	0.577	0.093	0.259	0.575	0.093	0.002	0.002

Notes: *p<0.1; **p<0.05; ***p<0.01. Columns (1), (4), and (6)-(7) are estimated using OLS. Columns (2) and (5) are estimated using Poisson regression. Columns (3) and (6) are estimated using Negative Binomial regression. Columns (1)-(6) employ the restricted sample, where $\text{Layoff}_{share} \geq 0$. t-values reported in parentheses. Standard errors are clustered at the country-level.

ative Binomial model to overcome the restrictions imposed by the Poisson model[18]. All model specifications point to similar conclusions. The estimates support our previous results that the deferral of payment and wage subsidies were the most effective government support schemes with respect to labor market outcomes. Firms that received wage subsidies as compared to other forms of public support, laid off 33.8 percent fewer workers on average (column (3))[19]. A back of the envelope calculation suggests that, in our restricted sample, where the mean number of workers laid off per firm amounts to 7.84, wage subsidies can save, on average, 2.65 employees per firm.

[18] We also use a likelihood ratio test to compare the Poisson model and the Negative Binomial model. We find strong evidence that Negative Binomial model is more appropriate in our case. Results of test statistics are available upon request.

[19] $[(e^{(-0.413)} - 1) \times 100 = -33.8]$

Table 6: Regression Results: Finance

	Dependent variable:			
	$\text{Overdue}_{Financial}$		Overdue_{Other}	
	(1)	(2)	(3)	(4)
Cash transfer = Yes	-0.030^{***}	-0.032^{***}	-0.048^{*}	-0.047^{*}
	(−2.952)	(−3.288)	(−1.717)	(−1.711)
Deferral of payments = Yes	-0.095^{***}	-0.095^{***}	-0.198^{***}	-0.198^{***}
	(−7.960)	(−7.903)	(−7.146)	(−7.148)
Credit access = Yes	−0.014	−0.014	-0.050^{*}	-0.050^{*}
	(−0.963)	(−1.002)	(−1.781)	(−1.780)
Fiscal exemptions = Yes	-0.040^{***}	-0.040^{***}	-0.076^{***}	-0.076^{***}
	(−3.465)	(−3.457)	(−4.080)	(−4.079)
Wage Subsidies = Yes	-0.042^{***}	-0.042^{***}	-0.050^{**}	-0.049^{**}
	(−5.389)	(−5.329)	(−2.079)	(−2.070)
Stringency controls	Yes	Yes	Yes	Yes
Baseline firm controls	Yes	Yes	Yes	Yes
Follow-up firm controls	Yes	Yes	Yes	Yes
Sector fixed effects	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes
Observations	3,869	3,869	3,927	3,927
R^2	0.106	0.108	0.098	0.098

Notes: *p<0.1; **p<0.05; ***p<0.01. All models are estimated using Logistic Regression. t-values reported in parentheses. Standard errors are clustered at the country-level.

5.2.2 Financial Vulnerability

In this section we look at a different dimension of firms' vulnerability, namely the probability to delay payments. Hence, Table 6 displays the results of logistic regressions where the dependent variables are binary indicators equal to unity if the firm delayed payments due to the COVID-19 outbreak. The coefficients pertain to average marginal effects. We also provide the results of an alternative linear model specification in Table A3 in the Appendix. [20] The follow-up questionnaire distinguishes between a delay in payments to financial institutions, suppliers, landlords and tax authorities (Figure A1 Panel (c) in the Appendix). We construct two dummy variables, one that captures the delay in payment to financial institu-

[20] The logistic regression model does not converge when using the probability to declare bankruptcy due to complete separation in some of our covariates (i.e. some of our variables perfectly predict the outcome), as well as a low prevalence of insolvency in our sample in general (n = 189). Therefore, we can only report the results for this dependent variable employing a linear probability model.

tions ($\text{Overdue}_{Financial}$) and another one that indicates if the establishment delayed any other payments (Overdue_{Other}). The coefficients for deferral of payments, fiscal exemptions and wage subsidies are negative and significant in all model specifications. Receiving national or local government support in the form of payment deferral has the strongest impact on firms' ability to repay their financial obligations in time. It decreases the probability of a firm being overdue on its obligations to any financial institution by 9.5% (Table 6 column (1)) and the probability of delaying payments due to COVID-19 for more than one week to its suppliers, landlords or the tax authorities by 19.8% (Table 6 column (3)). The results also show, that receiving direct cash transfers and wage subsidies had a positive impact on firms' financial situation, decreasing the probability of being overdue on obligations to financial institutions by 3% and 4.2%, respectively.

6 Conclusion

The COVID-19 pandemic represents an extraordinary challenge for societies worldwide. Even though such a crisis has not been encountered during the more recent decades, the globalized world we live in, characterized by a high mobility of goods and people has shown that it can be easily susceptible to similar situations in the future. A disease that starts in one area of the globe can spread fast to everywhere else paralyzing public life.

Our research contributes to understanding the effect of both government restrictions as well as support policies that may be required during such a crisis. We provide insight into what to expect if governments decide to implement drastic containment policies and what type of enterprises are most likely to be hit.

We employ data on more than 10,000 firms from 23 Southern and Eastern European countries. Our findings reveal that the containment measures badly affected especially small enterprises, exporting firms of firms in the facility sector that recorded sales drops of up to 100% with a complete lockdown. The gap between losses of firms operating in differ-

ent sectors widens with increasing stringency. In addition, firms with a higher share of female owners experience larger sale reductions compared to firms with a higher share of male owners, suggesting the existence of gender-based differences in the consequences of the pandemic.

We also find that the different forms of government support helped firms in dealing with the negative repercussions. Both financial as well as labour support policies decreased the number of redundancies as well as the probability of delaying payment obligations. For instance, assuming the mean number of laid off employees ranges between 3.3 and 7.8 in the unrestricted and restricted sample respectively, a 33.8% reduction in layoffs due to wage subsidies implies up to 2.7 jobs per firm were saved due to these support mechanisms.

A Appendix

Table A1: Regression Results: Response Stringency, alternative specifications

	Dependent variable:					
	%Δsales					
	(1)	(2)	(3)	(4)	(5)	(6)
$OxCGRT^{SI}$	−0.637***	−0.641***	−0.763***	−0.588***	−0.592***	−0.735***
	(−7.609)	(−7.510)	(−8.498)	(−3.352)	(−3.308)	(−4.016)
Export = No	2.005*			2.007*		
	(1.882)			(1.886)		
Import = No	−0.469			−0.499		
	(−0.526)			(−0.560)		
$\text{Sales}_{ExportShare}$		−0.047***	−0.045***		−0.048***	−0.044***
		(−4.042)	(−3.928)		(−4.046)	(−3.835)
$\text{Supply}_{ImportShare}$		−0.004	−0.005		−0.004	−0.005
		(−0.460)	(−0.553)		(−0.398)	(−0.529)
log(age)	−0.267	−0.266	−0.265	−0.291	−0.289	−0.291
	(−0.709)	(−0.717)	(−0.724)	(−0.776)	(−0.785)	(−0.802)
log(employees)	2.486***	2.680***	0.342	2.506***	2.702***	0.081
	(5.708)	(6.365)	(0.376)	(5.644)	(6.279)	(0.080)
$\text{Owner}_{FemaleShare}$	−0.023**		−0.023*	−0.023**		−0.023*
	(−2.001)		(−1.919)	(−2.020)		(−1.924)
FemaleOwner = No		0.986*			0.986*	
		(1.832)			(1.790)	
Innovation = No	−1.524*	−1.541*	−1.542*	−1.493*	−1.508*	−1.526*
	(−1.872)	(−1.775)	(−1.751)	(−1.831)	(−1.735)	(−1.733)
Closure = No	13.850***	13.835***	13.818***	13.874***	13.860***	13.832***
	(9.871)	(9.927)	(9.999)	(9.879)	(9.931)	(10.055)
SaleChange = No	−6.805***	−6.633***	−6.702***	−6.840***	−6.667***	−6.751***
	(−4.113)	(−4.026)	(−4.159)	(−4.131)	(−4.044)	(−4.172)
ISIC_F	0.761	0.465	0.340	0.711	0.416	0.324
	(0.421)	(0.272)	(0.205)	(0.392)	(0.242)	(0.195)
ISIC_G	4.366***	4.133***	4.144***	4.383***	4.145***	4.162***
	(5.468)	(5.197)	(5.290)	(5.514)	(5.226)	(5.347)
ISIC_H	−25.783***	−26.029***	−25.848***	−25.775***	−26.016***	−25.805***
	(−5.478)	(−5.690)	(−5.674)	(−5.472)	(−5.683)	(−5.665)
ISIC_I	−9.637***	−9.652***	−9.740***	−9.619***	−9.634***	−9.745***
	(−4.571)	(−4.385)	(−4.386)	(−4.562)	(−4.379)	(−4.390)
ISIC_K	0.859	0.829	0.606	0.724	0.688	0.448
	(0.335)	(0.332)	(0.234)	(0.281)	(0.274)	(0.172)
$OxCGRT^{SI}$:log(employees)			0.041***			0.043***
			(2.725)			(2.779)
Constant	2.190	3.303	10.694	−0.686	0.389	10.052
	(0.274)	(0.407)	(1.356)	(−0.046)	(0.025)	(0.647)
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8,888	8,888	8,888	8,888	8,888	8,888
R^2	0.239	0.240	0.242	0.238	0.238	0.241
Adjusted R^2	0.236	0.237	0.238	0.234	0.235	0.238
Residual Std. Error	27.152 (df = 8851)	27.139 (df = 8851)	27.106 (df = 8850)	27.176 (df = 8851)	27.163 (df = 8851)	27.121 (df = 8850)
F Statistic	77.172*** (df = 36; 8851)	77.499*** (df = 36; 8851)	76.177*** (df = 37; 8850)	76.606*** (df = 36; 8851)	76.925*** (df = 36; 8851)	75.833*** (df = 37; 8850)

Notes: *p<0.1; **p<0.05; ***p<0.01. All models are estimated using OLS. t-values reported in parentheses. Standard errors are clustered at the country-level.

Table A2: Regression Results: Response Stringency, robustness checks

	Dependent variable:			
	%Δsales			
	(1)	(2)	(3)	(4)
$OxCGRT^{SI}$	-0.639^{***}	-0.590^{***}	-0.640^{***}	-0.593^{***}
	(−7.581)	(−3.352)	(−7.580)	(−3.352)
Baseline firm controls	Yes	Yes	Yes	Yes
Follow-up firm controls	Yes	Yes	Yes	Yes
Sector fixed effects	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes
Observations	8,386	8,386	8,449	8,449
R^2	0.245	0.244	0.241	0.240
Adjusted R^2	0.242	0.241	0.238	0.237
Residual Std. Error	27.084 (df = 8350)	27.109 (df = 8350)	27.235 (df = 8414)	27.260 (df = 8414)
F Statistic	77.594^{***} (df = 35; 8350)	76.999^{***} (df = 35; 8350)	78.691^{***} (df = 34; 8414)	78.089^{***} (df = 34; 8414)

Notes: *p<0.1; **p<0.05; ***p<0.01. All models are estimated using OLS. t-values reported in parentheses. Standard errorsare clustered at the country-level. Column (1) and (3) employ the average stringency index. Column (2) and (4) employ the maximum value.
In column (1) and (2) we exclude all observations from Belarus. In column (3) and (4) we exclude all observations from Bosnia and Herzegovina and Serbia.

Table A3: Regression Results: Finance, Linear Probability Model

	Dependent variable:					
	$\text{Overdue}_{Financial}$		Overdue_{Other}		Insolvency	
	(1)	(2)	(3)	(4)	(5)	(6)
Cash transfer = Yes	-0.040^{***}	-0.040^{***}	-0.049^{*}	−0.049	−0.019	−0.018
	(−3.539)	(−3.651)	(−1.799)	(−1.791)	(−1.304)	(−1.487)
Deferral of payments = Yes	-0.115^{***}	-0.115^{***}	-0.212^{***}	-0.212^{***}	−0.011	-0.011^{*}
	(−6.141)	(−6.149)	(−7.086)	(−7.080)	(−1.508)	(−1.859)
Credit access = Yes	−0.021	−0.021	-0.053^{*}	-0.053^{*}	-0.025^{*}	-0.025^{*}
	(−1.234)	(−1.254)	(−1.783)	(−1.784)	(−1.861)	(−1.700)
Fiscal exemptions = Yes	-0.048^{***}	-0.048^{***}	-0.079^{***}	-0.079^{***}	-0.014^{*}	−0.014
	(−2.976)	(−2.990)	(−3.938)	(−3.938)	(−1.703)	(−1.458)
Wage Subsidies = Yes	-0.053^{***}	-0.052^{***}	-0.053^{**}	-0.052^{**}	−0.015	-0.014^{*}
	(−6.161)	(−6.061)	(−2.148)	(−2.141)	(−1.479)	(−1.749)
Stringency controls	Yes	Yes	Yes	Yes	Yes	Yes
Baseline firm controls	Yes	Yes	Yes	Yes	Yes	Yes
Follow-up firm controls	Yes	Yes	Yes	Yes	Yes	Yes
Sector fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,869	3,869	3,927	3,927	3,958	3,958
R^2	0.083	0.083	0.124	0.124	0.079	0.079
Adjusted R^2	0.073	0.073	0.115	0.115	0.069	0.069
Residual Std. Error	0.319 (df = 3826)	0.319 (df = 3826)	0.460 (df = 3884)	0.460 (df = 3884)	0.142 (df = 3915)	0.141 (df = 3915)
F Statistic	8.202^{***} (df = 42; 3826)	8.263^{***} (df = 42; 3826)	13.098^{***} (df = 42; 3884)	13.099^{***} (df = 42; 3884)	7.945^{***} (df = 42; 3915)	7.979^{***} (df = 42; 3915)

Notes: *p<0.1; **p<0.05; ***p<0.01. All models are estimated using OLS. t-values reported in parentheses. Standard errors are clustered at the country-level.

Figure A1: COVID 19 Impact ES Follow-up Survey, selected questions

(a)

B.2	Comparing this establishment's sales for **[insert last completed month]** with the same month in 2019, did sales increase, remain the same, or decrease?

Increase	1	
Remain the same	2	*GO TO QUESTION B.3*
Decrease	3	
DON'T KNOW (SPONTANEOUS)	**-9**	*GO TO QUESTION B.3*
Don't know	-99	
	COVb2a	

	Percent
By what percentage did the sales increase?	COVb2b %
DON'T KNOW (SPONTANEOUS)	**-9**

	Percent
By what percentage did the sales decrease?	COVb2c %
DON'T KNOW (SPONTANEOUS)	**-9**

(b)

D.1	At the end of the last completed month, that is in **[insert last completed month]**, how many permanent, full-time employees did this establishment employ? Please include all employees and managers

	Number
Permanent, full-time employees end of last month	COVd1
DON'T KNOW (SPONTANEOUS)	**-9**
Don't know	-99

(c)

E.3	Since the outbreak of COVID-19, has this establishment delayed payments due to the COVID-19 outbreak for more than one week (excluding payments postponed following current regulation) to: **INTERVIEWER: READ OUT**

		Yes	No	DON'T KNOW (SPON.)	Don't know
Its suppliers	COVe3a	1	2	-9	-99
Its landlords	COVe3b	1	2	-9	-99
The tax authorities	COVe3c	1	2	-9	-99

E.4	Since the outbreak of COVID-19, has this establishment been overdue on its obligations to any financial institution?

Yes	1
No	2
DOES NOT APPLY (SPONTANEOUS)	**-7**
DON'T KNOW (SPONTANEOUS)	**-9**
Does not apply	-77
Don't know	-99
	COVe4

E.5	Since the outbreak of COVID-19, has this establishment filed for insolvency or bankruptcy?

Yes	1
No	2
DON'T KNOW (SPONTANEOUS)	**-9**
Don't know	-99
	COVe5

Notes: The complete questionnaire can be accessed under https://www.enterprisesurveys.org/en/covid-19. If the survey was conducted in 2021, the question in Panel (a) refers to the same month in 2020 instead of the same month in 2019.

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